REMARKS

Claims 1 - 6, 13 - 19, and 22 - 30 are pending. Claims 1, 6, 13, 17, 19, 22, 24, 26, and 30 have been amended. Claims 20, 21, 31 and 32 have been cancelled, without prejudice. No new matter has been introduced. Reexamination and reconsideration of the application are respectfully requested.

In the April 18, 2003 Office Action, the Examiner objected to informalities on pages 2 and 3 of the specification. The Examiner rejected claims 19 and 25 under 35 U.S.C. § 112, second paragraph, for being indefinite. The Examiner rejected claims 1 - 5, 19 - 20, 22 - 23, and 26 - 29 under 35 U.S.C. § 102(a) as being anticipated by U.S. Published Patent Application No. 2001/0045815 to Muratov et al ("the Muratov reference"). The Examiner rejected claims 13 - 16, and 32 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,009,000 to Siri ("the Siri reference") in view of the Muratov reference. These rejections are respectfully traversed. The Examiner objected to claims 6, 17, 18, 24, 25, and 30, but indicated that the claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 6, 17, 24, and 30 have been rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 18 and 25 depend directly from claims 17 and 24, respectively. Therefore, applicants respectfully submit that claims 6, 17, 18, 24, 25, and 30 are now in condition for allowance.

Fig. 3 has been amended to be consistent with the specification. A redlined copy of Fig. 3 is attached herewith.

Claims 19 and 22 have been amended to clarify the invention. Applicants respectfully submit that claims 19 and 22, as amended, overcome the 35 U.S.C. § 112, second paragraph rejections and address the Examiner's objections to the specification.

The present invention is directed to a method and power supply regulator for regulation of multiple supply voltages for microelectronics devices. The microelectronics device is designed to operate at two different supply voltages, V_{cc1} and V_{cc2}. A regulator circuit may be provided in an embodiment which includes two distinct regulator circuits (one being used to supply regulation for V_{cc1} and one being used to supply regulation for V_{cc2}). A first input voltage required value may be, for example, 2.0 V_{DC}, and a second input voltage required value may be, for example, 1.4 V_{DC}. The principal supply voltage is operated within a specified tolerance window with an upper limit bound by a first reliability voltage value, V_{ccx}. The secondary supply voltage is operated within a specified tolerance window with an upper limit bound also by the first reliability voltage value, V_{ccx}. The principal supply voltage has a specified tolerance window for the lower limit bounded by a third reliability voltage value. The lower limit of the principal supply voltage is determined by multiplying (the difference of one minus a tolerance factor) times the first input voltage required value. The lower limit of the secondary supply voltage is determined by multiplying (the difference of one minus a tolerance factor) times the second input voltage required value. The second reliability voltage value and the third reliability voltage value are values are different from the first reliability voltage value.

Utilizing the example above, the primary supply voltage and the second primary supply voltage may have an upper limit bounded by a first reliability voltage value of 2.2

(2.0 multiplied by a tolerance factor of 10%). The primary supply voltage may have a lower limit bounded by 1.8 (2.0 multiplied by (one minus tolerance factor of .1 = .9)). The secondary supply voltage may have a higher limit bounded by a first reliability voltage value of 2.2. The secondary supply voltage may have a lower limit bounded by 1.26 ((1.4) x (1 - .10)). A regulation scheme may also be defined in terms of voltage-current loadlines. The loadline for each required input voltage required value may have a continuous slope from the required value to within the lower limit of the supply voltages. The loadline may be continuous or discontinuous. The loadline may be linear or non-linear.

Claim 1, as amended, recites:

1. A power supply system, comprising:

a controller configured to cause a regulator to produce a principal supply voltage and a secondary supply voltage, said regulator for coupling to a power source and to a microelectronics device to supply said principal supply voltage and said secondary supply voltage to said microelectronics device,

wherein said controller is further configured to maintain said principal supply voltage within a tolerance level bounded at a principal supply upper limit by a first reliability voltage value and bounded at a principal supply lower limit by a second reliability voltage value, and *to maintain said secondary supply voltage within a second tolerance level bounded at a secondary supply upper limit by the first reliability voltage value* and bounded at a secondary supply lower limit by a third reliability voltage value, said first reliability voltage is determined by multiplying one plus a tolerance level by a first input voltage required value.

The Muranov reference discloses a method to control the droop when powering dual mode processors and associated circuits. The dual modes of operation include a performance mode and a battery mode. A power converter's output is compensated for both operating voltage and frequency changes. The slope of the loadline is different for performance and battery optimizations. The slop of the load line is altered in accordance with the operating mode of the processor. The droop is centered to the medium load. Table 2 illustrates that the performance mode voltage, first voltage, is bounded at an upper limit by 1.025 multiplied by the performance mode output voltage, i.e., first voltage which is 1.64 volts, and bounded at a lower limit by 0.975 multiplied by the performance mode output voltage. The battery mode output voltage, i.e., second voltage which is equal to 1.384 volts, is bounded at an upper limit by 1.025 multiplied by the second voltage and bounded at a lower limit by 0.975 multiplied by the battery mode output voltage. *(Page 4, paragraphs 50 and 51; Table 2).*

The Muratov reference does not disclose, teach, or suggest the system in claim 1, as amended. Unlike the system in claim 1, as amended, the Muratov reference does not show a power supply system, including a controller configured to cause a regulator to produce a principal supply voltage and a secondary supply voltage, said regulator for coupling to a power source and to a microelectronics device to supply said principal supply voltage and said secondary supply voltage to said microelectronics device; wherein said controller is further configured to maintain said principal supply voltage within a tolerance level bounded at a principal supply upper limit by a first reliability voltage value and bounded at a principal supply lower limit by a second reliability voltage value, and *to maintain said secondary supply voltage within a second tolerance* *level bounded at a secondary supply upper limit by the first reliability voltage value* and bounded at a secondary supply lower limit by a third reliability voltage value, said first reliability voltage is determined by multiplying one plus a tolerance level by a first input voltage required value.

Instead, the Muratov discloses a voltage regulator with a controller to produce a principal supply voltage within a tolerance level, e.g., 2.5%, and a secondary supply voltage within a tolerance level, e.g., 2.5%, where the primary supply voltage upper limit is bounded by a first reliability voltage value and the secondary supply voltage upper limit is bounded by a second reliability voltage and the first reliability voltage value and the second reliability voltage values are different. *(Page 4, paragraphs 50 and 51; Table 2).* This is not the same as the same as a power supply system, including a controller configured to cause a regulator to produce a principal supply voltage and a secondary supply voltage, said regulator for coupling to a power source and to a microelectronics device to supply said principal supply voltage and said secondary supply voltage to said microelectronics device; wherein said controller is further configured to maintain said principal supply voltage within a tolerance level bounded at a principal supply upper limit by a first reliability voltage value and bounded at a principal supply lower limit by a second reliability voltage value, and *to maintain said secondary supply voltage within a second tolerance level bounded at a secondary supply upper limit by the first reliability voltage value* and bounded at a secondary supply lower limit by a third reliability voltage value, wherein said first reliability voltage is determined by multiplying one plus a tolerance level by a first input voltage required value. The Muratov reference is not the same because its principal supply voltage, *i.e.*, performance mode, supply voltage and its secondary supply voltage, *i.e.* battery mode, are bounded at an upper limit by two unique voltages.

Accordingly, applicants respectfully submit that independent claim 1, as amended, distinguishes over the Muratov reference.

Independent claim 19, as amended, recites similar limitations to independent claim 1, as amended. Accordingly, applicants respectfully submit that independent claim 19, as amended, distinguishes over the Muratov reference for the reasons set forth above in regards to independent claim 1, as amended.

Claims 2- 5 and 22 - 23 depend directly or indirectly from independent claims 1 and 19, respectively. Accordingly, applicants respectfully submit that claims 2 - 5 and 22 - 23 distinguish over the Muratov reference, alone or in combination, for the reasons set forth above with respect to independent claim 1, as amended.

Claim 26, as amended, recites:

> A regulating method, comprising:
>
> supplying multiple input voltages to one or more microelectronics devices, each of said multiple input voltages including a corresponding input voltage required value;
>
> *determining an upper limit of the voltage regulation range for all of said multiple input voltages by multiplying a first corresponding input voltage required value by a sum of one plus a tolerance level;*
>
> determining a lower limit of a voltage regulation range for said multiple input voltages in accordance with a corresponding voltage-current loadline; and

maintaining each of said multiple input voltages supplied to said microelectronics devices above said lower limit of said voltage regulation range and under said first reliability voltage.

The Muratov reference does not disclose, teach, or suggest the regulating method of claim 26, as amended. Unlike the regulating method of claim 26, as amended, the Muratov reference does not disclose a regulating method including: supplying multiple input voltages to one or more microelectronics devices, each of said multiple input voltages including a corresponding input voltage required value; *determining a common upper limit of the voltage regulation range for all of said multiple input voltages by multiplying a first corresponding input voltage required value by a sum of one plus a tolerance level;* determining a lower limit of a voltage regulation range for said multiple input voltages in accordance with a corresponding voltage-current loadline; and maintaining each of said multiple input voltages supplied to said microelectronics devices above said lower limit of said voltage regulation_range and under said first reliability voltage.

Instead, the Muratov reference discloses determining a unique upper limit of the voltage regulation range for each of said multiple input voltages. *(Page 4, paragraphs 50 and 51; Table 2).* This is not the same as a voltage regulation method including *determining a common upper limit of the voltage regulation range of all of said multiple input voltages by multiplying a first corresponding input voltage required value by a sum of one plus a tolerance level* because the Muratov reference teaches the establishing of <u>multiple</u> upper limits of a voltage regulation range. Accordingly, applicants respectfully submit claim 26, as amended, distinguishes over the Muratov reference.

Dependent claims 27 - 29 depend, directly or indirectly, on claim 26, as amended. Thus, applicants respectfully submit that claims 27 - 29 distinguish over the Muratov reference for the reasons set forth above with respect to independent claim 26.

Claim 13, as amended, recites:

A regulator, comprising:

a plurality of regulator circuits for coupling to a microelectronics device to provide a plurality of regulated input voltages to said microelectronics device, *the plurality of regulated input voltages being maintained within an input voltage range bounded at an upper limit by a first reliability voltage value, the first reliability voltage value determined by multiplying a first one of the plurality of regulated input voltages by the sum of one and a tolerance level,* wherein each regulator circuit provides a particular one of said plurality of regulated input voltages to said microelectronics device,

wherein each said regulator circuit further includes:

a controller including a comparator and a threshold detector, an input of said comparator being coupled to the output of said threshold detector,

a switch coupled to said controller and operating in response to a signal provided by said controller, said switch connected to an inductor, a diode, and an output capacitor arranged in a network that produces a load current in response to an input source voltage received via said switch, and a current sense feedback network connected to said network output and having a gain factor, said feedback network coupled to said threshold detector to cause said threshold detector to produce an output signal as a product of said gain factor,

wherein said controller is configured to produce one of said plurality of regulated input voltages by varying the duty cycle of said switch in accordance with a voltage current loadline,

wherein said controller is further configured to maintain said one of said plurality of regulated input voltages within an input voltage range bounded at a lower limit, and

wherein said lower limit for said one of said plurality of regulated input voltages is computed by said controller in order to maintain said one of said plurality of regulated input voltages in accordance with said voltage-current loadline of said one of said plurality of regulated input voltages for different values of said load current.

The Siri reference is directed to a power system that connects an input voltage 10 to a load 12 through a plurality of N parallel connected current mode power stages 14a - 14n. The power system is used to convert the input voltage 10 on lines 16a and 16b to <u>an output voltage</u> *(not multiple output voltages)* on lines 18a and 18b. A shared bus 20 is connected to the parallel power stages 14a - n to form a common control line for regulating all of the current mode power stages 14a - 14n. *(Col. 8, lines 10 - 23, Fig. 1)*. Each of the power stages 14a - 14n include a converter, *e.g.*, 30a, and a control circuit 32a. The input voltage source 10 supplies electrical power over lines, *e.g.*, 16a and 16b, to a plurality of DC to DC converters, *e.g.*, 30a and 30b, which provide power to the common load 12 through a cable, *e.g.*, 31a and 31b. The converters, *e.g.*, 30a, are controlled by the control circuit, *e.g.*, 32a and 32b. *(Col. 8, lines 10 - 23, Figs. 1, 2, and 3.)* The Siri reference discloses that each of the power stages may produce a voltage within a 1% of their reference voltage, which is not the same as the overall output voltage. *(Col. 3, lines 21 - 23).*

The Siri reference does not disclose, teach, or suggest the system in claim 13, as amended. Unlike the regulator in claim 13, as amended, the Siri reference does not show a regulator, including: a plurality of regulator circuits for coupling to a microelectronics device to provide a plurality of regulated input voltages to said microelectronics device, *the plurality of regulated input voltages being maintained within an input voltage range bounded at an upper limit by a first reliability voltage value, the first reliability voltage value determined by multiplying a first one of the plurality of regulated input voltages by the sum of one and a tolerance level,* wherein each regulator circuit provides a particular one of said plurality of regulated input voltages to said microelectronics device, wherein each said regulator circuit further includes: a controller including a comparator and a threshold detector, an input of said comparator being coupled to the output of said threshold detector, a switch coupled to said controller and operating in response to a signal provided by said controller, said switch connected to an inductor, a diode, and an output capacitor arranged in a network that produces a load current in response to an input source voltage received via said switch, and a current sense feedback network connected to said network output and having a gain factor, said feedback network coupled to said threshold detector to cause said threshold detector to produce an output signal as a product of said gain factor, wherein said controller is configured to produce one of said plurality of regulated input voltages by varying the duty cycle of said switch in accordance with a voltage current loadline, wherein said controller is further configured to maintain said one of said plurality of regulated input voltages within an input voltage range bounded at a lower limit, and wherein said lower limit for said one of said plurality of regulated input voltages is computed by said controller in order to maintain said one of said plurality of regulated input voltages in accordance with said voltage-current loadline of said one of said plurality of regulated input voltages for different values of said load current.

Instead the Siri reference is directed to providing a power system including multiple parallel connected current mode power converters for producing a single output voltage to a load, where a voltage error signal on a shared bus is utilized for controlling all of the power stages in both transient and steady states. *(Abstract, col. 8, lines 10 - 54)*. The Siri reference does not show a regulator including a plurality of regulator circuits for coupling to a microelectronics device to provide a plurality of regulated input voltages to said microelectronics device, *the plurality of regulated input voltages being maintained within an input voltage range bounded at an upper limit by a first reliability voltage value, the first reliability voltage value determined by multiplying a first one of the plurality of regulated input voltages by the sum of one and a tolerance level,* wherein each regulator circuit provides a particular one of said plurality of regulated input voltages to said microelectronics device because the Siri reference only produces a single output voltage to the load. If only one output voltage is produced, a plurality of regulated input voltages cannot be maintained within an input range bounded at an upper limit by a first reliability voltage value. Accordingly, applicants respectfully submit that claim 13, as amended, distinguishes over the Siri reference.

The Muratov reference does not make up for the deficiencies of the Siri reference. Unlike the regulator in claim 13, as amended, the Muratov reference does not show a regulator, including: a plurality of regulator circuits for coupling to a microelectronics device to provide a plurality of regulated input voltages to said microelectronics device, *the plurality of regulated input voltages being maintained within an input voltage range bounded at an upper limit by a first reliability voltage value, the first reliability voltage value determined by multiplying a first one of the plurality of regulated input voltages by the sum of one and a tolerance level,* wherein each regulator circuit provides a particular one of said plurality of regulated input voltages to said microelectronics device, wherein each said regulator circuit further includes: a controller including a comparator and a threshold detector, an input of said comparator being coupled to the output of said threshold detector, a switch coupled to said controller and operating in response to a signal provided by said controller, said switch connected to an inductor, a diode, and an output capacitor arranged in a network that produces a load current in response to an input source voltage received via said switch, and a current sense feedback network connected to said network output and having a gain factor, said feedback network coupled to said threshold detector to cause said threshold detector to produce an output signal as a product of said gain factor, wherein said controller is configured to produce one of said plurality of regulated input voltages by varying the duty cycle of said switch in accordance with a voltage current loadline, wherein said controller is further configured to maintain said one of said plurality of regulated input voltages within an input voltage range bounded at a lower limit, and wherein said lower limit for said one of said plurality of regulated input voltages is computed by said controller in order to maintain said one of said plurality of regulated input voltages in accordance with said voltage-current loadline of said one of said plurality of regulated input voltages for different values of said load current.

Instead, the Muratov reference discloses that each of the plurality of input voltages for a microelectronics device is maintained within a voltage range bounded at an upper limit by a unique reliability voltage value. For example, the first input voltage is bounded at an upper limit by a first reliability voltage value and the second input voltage is bounded at an upper limit by a second reliability voltage value, the second reliability voltage value being different from the first reliability voltage value. This is not the same as a regulator including a plurality of regulator circuits for coupling to a microelectronics device to provide a plurality of regulated input voltages to said microelectronics device, *the plurality of regulated input voltages being maintained within an input voltage range bounded at an upper limit by a first reliability voltage value, the first reliability voltage value determined by multiplying a first one of the plurality of regulated input voltages by the sum of one and a tolerance level,* wherein each regulator circuit provides a particular one of said plurality of regulated input voltages to said microelectronics device because each of the Muratov reference regulated input voltages are maintained with an input voltage range bounded at an upper limit by a unique reliability voltage value, which is different from the first reliability voltage value.

Claims 14 - 16, all as amended, depend directly or indirectly from independent claim 13, as amended. Accordingly, applicants respectfully submit that claims 14 - 16 distinguish over the Siri reference and the Muratov reference, alone or in combination, for the reasons set forth above with respect to independent claim 13, as amended.

Applicants believe that the foregoing amendments place the application in condition for allowance, and a favorable action is respectfully requested. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call either of the undersigned attorneys at the Los Angeles telephone number (213) 488-7100 to discuss the steps necessary for placing the application in condition for allowance should the Examiner believe that such a telephone conference would advance prosecution of the application.

Respectfully submitted,

PILLSBURY WINTHROP LLP

Date: July 2, 2003

By: [signature]
Mark R. Kendrick
Registration No. 48,468
Attorney for Applicant(s)

Date: July 2, 2003

By: [signature]
Roger R. Wise
Registration No. 31,204
Attorney For Applicant(s)

725 South Figueroa Street, Suite 2800
Los Angeles, CA 90017-5406
Telephone: (213) 488-7100
Facsimile: (213) 629-1033

APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE DRAWINGS

Fig. 3 has been amended as shown by redlines on the enclosed copy thereof.

IN THE CLAIMS:

Claims 20, 21, 31 and 32 have been cancelled, without prejudice. Claims 1, 6, 13, 17, 19, 22, 24, 26, and 30 have been amended, as follows:

1. (Twice Amended) A power supply system, comprising:

a controller configured to cause a regulator to produce a principle supply voltage and a secondary supply voltage, said regulator for coupling to a power source and to a microelectronics device to supply said principal supply voltage and said secondary supply voltage to said microelectronics device[; and],

wherein said controller is further configured to maintain said principal supply voltage within a tolerance level bounded at a principal supply upper limit by a first reliability voltage value and bounded at a principal supply lower limit by a second reliability voltage value, and to maintain said secondary supply voltage within a second tolerance level bounded at a secondary supply upper limit by the first reliability voltage value and bounded at a secondary supply lower limit by a third reliability voltage value and said first reliability voltage value, said first reliability voltage is determined by multiplying one plus a tolerance level by a first input voltage required value.

6. (Twice Amended) A power supply system, comprising:

a controller configured to cause a regulator to produce a principal supply voltage and a secondary supply voltage, said regulator for coupling to a power source and to a microelectronics device to supply said principal supply voltage and said secondary supply voltage to said microelectronics device,

wherein said controller is further configured to maintain said principal supply voltage within a tolerance level bounded at a principal supply upper limit by a first reliability voltage value and bounded at a principal supply lower limit by a second reliability voltage value, and to maintain said secondary supply voltage within a second tolerance level bounded at a secondary supply upper limit by the first reliability voltage value and bounded at a secondary supply lower limit by a third reliability voltage value, and

the principal supply voltage and the secondary supply voltage are determined in accordance with a voltage-current loadline and [The system of claim 3, wherein] said controller is further configured to determine said gain factor in order to produce the principal supply voltage and the secondary supply voltage according to said voltage-current loadline and said voltage-current loadline specifies a non-linear relationship and said non-linear loadline further includes a discontinuity corresponding to an immediate current value between zero and a maximum.

13. (Twice Amended) A regulator, comprising:

[at least two] a plurality of regulator circuits[, each said regulator circuit] for coupling to a microelectronics device to provide a plurality of regulated input voltages to said microelectronics device, the plurality of regulated input voltages being maintained within an input voltage range bounded at an upper limit by a first reliability voltage value, the first reliability voltage value determined by multiplying a first one of the plurality of regulated input voltages by the sum of one and a tolerance level, wherein each [said] regulator circuit provides a particular one of said plurality of regulated input voltages to said microelectronics device[;],

wherein each said regulator circuit further includes:

a controller including a comparator and a threshold detector, an input of said comparator being coupled to the output of said threshold detector,

a switch coupled to said controller and operating in response to a signal provided by said controller, said switch connected to an inductor, a diode, and an output capacitor arranged in a network that produces a load current in response to an input source voltage received via said switch, and

a current sense feedback network connected to said network output and having a gain factor, said feedback network coupled to said threshold detector to cause said threshold detector to produce an output signal as a product of said gain factor,

wherein said controller is configured to produce one of said plurality of [said] regulated input voltages by varying the duty cycle of said switch in accordance with a voltage current loadline,

wherein said controller is further configured to maintain said one of said plurality of regulated input voltages within an input voltage range [bounded at an upper limit by a first reliability voltage value and] bounded at a lower limit, and

wherein said lower limit for said one of said plurality of regulated input voltages is computed by said controller in order to maintain said one of said plurality of regulated input voltages in accordance with said voltage-current loadline of said one of said plurality of regulated input voltages for different values of said load current.

17. (Twice Amended) A regulator, comprising:

at least two regulator circuits, each said regulator circuit for coupling to a microelectronics device to provide a plurality of regulated input voltages to said microelectronics device, wherein each said regulator circuit provides a particular one of said regulated input voltages to said microelectronics device,

wherein each said regulator circuit further includes:

a controller including a comparator and a threshold detector, an input of said comparator being coupled to the output of said threshold detector,

a switch coupled to said controller and operating in response to a signal provided by said controller, said switch connected to an inductor, a diode, and an output capacitor arranged in a network that produces a load current in response to an input source voltage received via said switch, and

a current sense feedback network connected to said network output and having a gain factor, said feedback network coupled to said threshold detector to cause said threshold detector to produce an output signal as a product of said gain factor,

wherein said controller is configured to produce one of said plurality of said regulated input voltages by varying the duty cycle of said switch in accordance with a voltage current loadline,

wherein said controller is further configured to maintain said one of regulated input voltages within an input voltage range [bounded by a constant at an upper limit by a first reliability voltage value and] bounded at a lower limit, and

wherein said lower limit for said one of said plurality of regulated input voltages is computed by said controller in order to maintain said one of said plurality of regulated input voltages in accordance with said voltage-current loadline of said one of said plurality of regulated input voltages for different values of said load current and [The regulator of claim 14, wherein] said voltage-current loadline specifies a non-linear relationship.

19. (Twice Amended) An electronic system, comprising:

a microelectronics device having at least two input voltage required values to receive at least two input supply voltages;

a regulator coupled to said microelectronics device; and

a power source coupled to said regulator[;],

wherein said regulator is configured to produce said at least two supply voltages within an input voltage range bounded by an upper limit and a lower limit[;],

wherein said upper limit of each of said at least two input supply voltages is a first reliability voltage value, said first reliability voltage value is determined by multiplying one plus a tolerance level by a first input voltage required value[;], and

wherein said lower limit of each of said at least two input supply voltages is determined by [a gain factor] one minus a tolerance level multiplied by each of said at least two input supply voltage required values.

22. (Twice Amended) The electronic system of claim 19, wherein said regulator is further configured to determine said gain factor for each of said at least two input supply voltages according to a voltage-current loadline, and wherein said lower limit for each of said at least two input supply voltages is equal to [the product of] one minus a tolerance level multiplied by a corresponding one of the at least two input

supply voltage required values.

24. (Twice Amended) An electronic system, comprising:

a microelectronics device having at least two input voltage required values to receive at least two input supply voltages;

a regulator coupled to said microelectronics device; and

a power source coupled to said regulator,

wherein said regulator is configured to produce said at least two supply voltages within an input voltage range bounded by an upper limit and a lower limit, and

wherein said upper limit of each of said at least two input supply voltages is a first reliability voltage value; said lower limit of each of said at least two input supply voltages is determined by a gain factor multiplied by each of said at least two input supply voltage required values, and [The electronic system of claim 19, wherein] said regulator adjusts said gain factor to produce said at least two input supply voltages according to a voltage-current loadline, and wherein said loadline specifies a non-linear relationship.

26. (Twice Amended) A regulating method, comprising:

supplying multiple input voltages to one or more microelectronics devices, each of said multiple input voltages including a corresponding input voltage required value;

determining an upper limit of the voltage regulation range for all of said multiple input voltages by multiplying a first corresponding input voltage required value by a sum of one plus a tolerance level;

determining a lower limit of a voltage regulation range for said multiple input voltages in accordance with a corresponding voltage-current loadline; and maintaining each of said multiple input voltages supplied to said microelectronics devices above said lower limit of said voltage regulation range and under said first reliability voltage.

30. (Twice Amended) A regulating method, comprising:

supplying multiple input voltages to one or more microelectronics devices, each of said multiple input voltages including a corresponding input voltage required value;

determining a lower limit of a voltage regulation range for said multiple input voltages in accordance with a corresponding voltage-current loadline; and

maintaining each of said multiple input voltages supplied to said microelectronics devices above said lower limit of said voltage regulation range and under said first reliability voltage,

wherein said determining further includes selecting a gain factor in order to produce said multiple input voltages according to said corresponding voltage-current loadline, [The method of claim 28, wherein said determining further includes] adjusting a gain factor as required to produce said multiple input voltages according to said corresponding voltage-current loadline, where said voltage-current loadline specifies a non-linear relationship, and said lower limit is equal to the product of one minus a tolerance level multiplied by said corresponding input voltage required value.

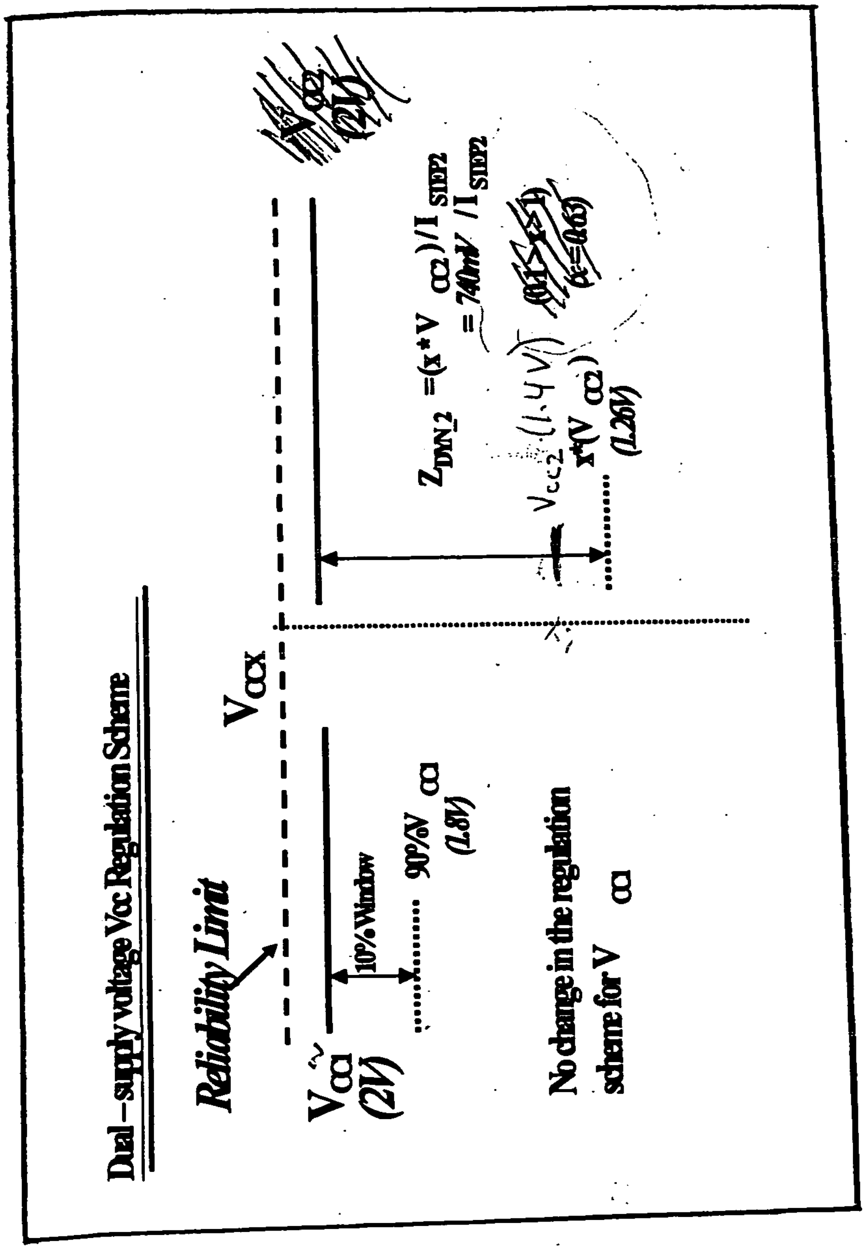
Dual–supply voltage Vcc Regulation Scheme
Reliability Limit
V_CCX
V_CC1 (2V)
10% Window
90%*V_CC1 (1.8V)
No change in the regulation scheme for V_CC1
Z_DYN_2 = (x*V_CC2)/I_STEP2
= 740mV / I_STEP2
x*(V_CC2) (1.26V)

Fig. 3